

REMARKS

This Amendment responds to the Office Action dated December 15, 2005. Applicant is appreciative of Examiner's comments regarding the allowability of the claims 15-21 based upon the inclusion of the subject matter recited in any associated base claim and any intervening claims, and the allowance of claims 22 and 23. By way of this amendment, claims 10-11 remain canceled and claims 13-14 have been canceled solely to expedite prosecution of the pending application. Further, claim 12 has been amended to include the subject matter of dependent claims 13 and 14 to precisely define Applicants' invention. Accordingly, claims 1-9, 12 and 15-23 are presently under consideration in this application.

35 U.S.C. § 103(a) REJECTIONS

Claims 1-8 and 12-14 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Muramatsu (JP 2000-121408) in view of O'Shea (USP 6,766,688). Claim 9 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Muramatsu in view of O'Shea and in further view of Martel (USP 5,642,097). Lastly, claims 12-14 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Muramatsu in view of Martel. Applicants respectfully traverse these rejections.

Applicants submit that in order to establish a *prima facie* case of obviousness, three basic criteria must be met: there must be a suggestion or motivation in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the reference or to combine the teachings of one or more references, there must be a reasonable expectation of success, and the prior art reference(s) must teach or suggest all the claim limitations. As is understood, the Examiner bears the burden of establishing a *prima facie* case of obviousness and "can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings and references. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988).

Further, the references must either expressly or impliedly suggest the claimed invention, or else the office action must contain a convincing line of reasoning as to why one of ordinary skill in the art would have found the invention, as claimed, to have been obvious.

See Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). Applicants assert that the cited references do not teach nor suggest the claim limitations, and therefore, no *prima facie* case of obviousness has been established.

Claim 1 recites, which relates to a method of monitoring a level of liquid fuel in a tank having a known capacity, positively recites, in part, the steps of *measuring a flow rate of gaseous fuel flowing through the supply line*, calculating an expended fuel volume based on the measured flow rate, and determining a remaining liquid fuel level in the tank based on the expended fuel volume and tank capacity. One skilled in the art will appreciate that the method of claim 1 for determining the remaining liquid phase fuel volume in the tank is based upon a measurement of the flow rate of fuel as the fuel is dispensed, such as in the gas phase.

By comparison, the Muramatsu reference does not measure flow rate of a gaseous fuel flowing through the supply line, and in fact does not take a flow rate measurement at all. Although the office action hinges on a statement that Muramatsu does teach such a limitation, the office action misreads Muramatsu, stating:

Regarding claim 1, Muramatsu teaches measuring a flow rate of a fuel through the supply line (see abstract); calculating an expended fuel volume based on the measured flow rate (see abstract); determining a remaining liquid fuel level in the tank based on the expended fuel volume and tank capacity (see abstract).

However, a more careful reading of the Muramatsu Abstract reveals the foregoing statement is not correct. A proper reading of Muramatsu reveals that the reference actually measures the remaining volume of liquid in a tank without measuring a flow rate of fuel. Specifically, the Abstract of Muramatsu reads as follows:

BASIC-ABSTRACT:

NOVELTY – A calculator computes the volume of vacant space remaining in the fuel tank, based on the pump flow rate and elapsed time until the detected tank internal pressure after starting operation of the pump reaches setting pressure. Remaining amount of liquid fuel remaining in fuel tank is computed, based on computed volume of vacant space of fuel tank.

DETAILED DESCRIPTION – A pump controller controls operating stage of pump (6) which pushes in air in fuel tank. A tank external pressure detector detects the tank internal pressure.

USE – For measuring amount of liquid fuel remaining in fuel tank of motor vehicle.

ADVANTAGE – Remaining amount of liquid fuel tank in fuel tank can be measured accurately, without using level gage, thus number of parts is reduced.

Specifically, under the heading ‘NOVELTY’, the reference calculates the volume of the vacant space within the fuel tank - and hence calculates the volume of the liquid fuel remaining in the tank - based on the known pump flow rate in conjunction with the elapsed time the pump has been running. The reference plainly does not actually measure fuel flowing through the fuel line. One of ordinary skill in the art understands that the flow rate of the pump, in view of the elapse time of operation, provides a volumetric measurement of the gas transferred by the pump to pressurize the tank. The liquid level remaining is simply the difference between the known tank volume and the volume of gas from the pump computed using the elapsed time measurement. The reference simply does not measure the “flow rate of fuel” as concluded by the present office action.

Further, in the “DETAILED DESCRIPTION” section of the Abstract, the reference states that the “pump controller controls operating stage of pump (6) which pushes in air in [the] fuel tank. A tank external pressure detector detects the internal tank pressure” (emphasis added). That is, Muramatsu teaches pumping air into the tank for the purpose of computing the volume of “air” or space in the tank to infer remaining liquid volume. The teachings of Muramatsu completely – and intentionally - avoids measuring the actual flow rate of the fuel. In sum, Muramatsu, clearly does not teach measuring the fuel flow rate.

Additionally, neither O’Shea nor Martel teach or suggest taking a flow rate measurement. Instead, both O’Shea and Martel teach an apparatus very similar to a common automotive fuel gage device which relies upon actual measurement of the liquid level within the fuel tank. Specifically, O’Shea instructs a liquid level volume indicator [10] comprising a plastic float tube [50] magnetically coupling a floatation chamber [55] to an indicator shaft [28]. That is, the detector assembly [12] indicates tank volume by “riding” upon the liquid-gas interface within the tank. Martel only suggests a low fuel alarm.

Accordingly, the cited combination fails to teach or suggest all of the claim limitations, and therefore there is no proper *prima facie* case of obviousness. The rejection must be withdrawn. Accordingly, claim 1-9 are allowable over the cited prior art.

Moreover, one stated advantage of Muramatsu is to reduce the number of parts. See abstract, under the heading ADVANTAGE. However, to add a fuel sensor to measure fuel flowing through the fuel line is directly contrary to the above-stated express teaching of the reference. Accordingly, there would be no suggestion to make such a change. Further, the reference calculates fuel volume in the tank without measuring fuel flow via a fuel sensor, and thus to add a fuel sensor would be completely redundant. In either case, there cannot be a proper suggestion to make the needed modification, and therefore no proper *prima facie* case of obviousness can be established based even in part on the Muramatsu reference.

Claim 1, and the claims dependent on claim 1, are in allowable form.

Claim 12 has been amended to include the subject matter of claims 13 and 14, and now positively recites, in part, “a flow sensor associated with the supply line adapted to generate fuel flow information, the flow sensor including a communication link for communicating the fuel flow information and comprising a flow measurement module integrally provided with the regulator, wherein the flow measurement module includes a

processor and a memory such that the flow measurement module processor is programmed to calculate an expended fuel volume based on the fuel flow rate.”

As previously discussed, the prior art must disclose all of the claimed limitations. However, as outlined above, the cited references fail to teach or even suggest a flow sensor associated with the supply line. Accordingly, there can be no *prima facie* case of obviousness. Further, there is no way to modify the Muramatsu reference without destroying the express teachings of that reference, which is to eliminate components rather than to add components. Again, there can be no *prima facie* case of obviousness. Consequently, claim 12 is in allowable form, as are claims 15-21.

CONCLUSION

For the reasons stated above, Applicant submits that the specification and claims are in proper form and clearly define patentable subject matter with respect to the prior art. If there are any additional fees or refunds required, the Commissioner is directed to charge or debit Deposit Account No. 13-2855 of Marshall, Gerstein & Borun LLP.

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Respectfully submitted,

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